AMENDMENTS TO THE CLAIMS

1-26 (Canceled).

27 (New). A sensing fibre for use in a distributed temperature sensing system, the distributed temperature sensing system including an optical source for launching light into an end of the sensing fibre, the sensing fibre comprising:

an optical fibre for spatially extended deployment within a measurement region, the optical fibre incorporating:

a reflective element; and

a coiled fibre portion associated with the reflective element and positioned adjacent the reflective element on the side distal from the optical source, the coiled fibre portion contributing substantially nothing to the spatial extent of the optical fibre when deployed.

28 (New). A sensing fibre according to claim 27, in which the optical fibre is provided with a connector at its end on the side of the reflective element opposite the coiled fibre portion for connecting the optical fibre to a distributed temperature sensing system unit.

29 (New). A sensing fibre according to claim 27, in which the optical fibre incorporates one or more further reflective elements, and a coiled fibre portion associated with each of the one or more further reflective elements and positioned adjacent its associated further reflective element on the side distal from the optical source.

30 (New). A sensing fibre according to claim 27, in which the optical fibre incorporates a further coiled fibre portion associated with the or each reflective element and positioned adjacent

its associated reflective element on the side proximal to the optical source, the further coiled fibre portion contributing substantially nothing to the spatial extent of the optical fibre when deployed.

31 (New). A sensing fibre according to claim 27, in which the optical fibre is provided with a connector at its end on the side of the reflective element distal from the optical source for connecting the optical fibre to a distributed temperature sensing system unit.

32 (New). A sensing fibre according to claim 27, in which the or each coiled fibre portion has a length in the range 1 m to 500 m.

33 (New). A sensing fibre according to claim 27, in which the or each coiled fibre portion has a length in the range 1 m to 100 m.

34 (New). A sensing fibre according to claim 27, in which the or each coiled fibre portion has a length in the range 1m to 50 m.

35 (New). A sensing fibre according to claim 27, in which one or more of the or each reflective element comprises a join between two portions of optical fibre.

36 (New). A sensing fibre according to claim 35, in which the join comprises abutted end facets of the two portions of optical fibre, each facet arranged at an acute angle to a longitudinal axis of the optical fibre to reduce back-reflection of incident light.

37 (New). A sensing fibre according to claim 35, in which the join is implemented via an optical fibre connector.

38 (New). A distributed temperature sensing system comprising:

a sensing fibre according to any one of claim 27;

an optical source operable to launch pulses of probe light into the proximal end of the sensing fibre; and

a detector operable to detect light emitted from the proximal end of the sensing fibre arising from backscattering of the probe light within the sensing fibre, the detected light indicative of temperature along the spatial extent of the sensing fibre, and to generate an output signal representative of the detected light.

39 (New). A distributed temperature sensing system according to claim 38, in which, in use, the detector becomes saturated by light reflected from the or each reflective element and has a recovery time after saturation, and the or each coiled fibre portion has a length not less than a distance the backscattered light can propagate in the sensing fibre during the recovery time.

40 (New). A distributed temperature sensing system according to claim 38, and further comprising a processor operable to receive the output signal from the detector and to determine a profile of temperature along the spatial extent of the fibre from the output signal.

41 (New). A distributed temperature sensing system according to claim 38, further comprising a processor operable to receive the output signal from the detector and to remove

from the output signal a part or parts corresponding to detected light received from the or each coiled fibre portion.

42 (New). A distributed temperature sensing system according to claim 41, in which the processor is further operable to determine a profile of temperature along the spatial extent of the fibre from the output signal.

43 (New). A method of distributed temperature sensing comprising:

deploying an optical fibre in a measurement region in a spatially extended deployment, the optical fibre incorporating a reflective element and a coiled fibre portion associated with the reflective element and positioned adjacent one side of the reflective element, the coiled fibre portion contributing substantially nothing to the spatial extent of the deployed optical fibre;

launching a pulse of probe light into the end of the optical fibre on the side of the reflective element opposite the coiled fibre portion;

detecting light emitted from the end of the optical fibre on the side of the reflective element opposite the coiled fibre portion arising from backscattering of the probe light within the optical fibre, the detected light indicative of temperature along the spatial extent of the optical fibre;

generating an output signal representative of the detected light;

removing from the output signal a part corresponding to detected light received from the coiled fibre portion; and

determining a profile of temperature along the spatial extent of the fibre from the output signal.

44 (New). A method of distributed temperature sensing according to claim 43, in which the detecting is performed using a detector that becomes saturated by light reflected from the reflective element and has a recovery time after saturation, and the coiled fibre portion has a length not less than a distance the backscattered light can propagate in the optical fibre during the recovery time.

45 (New). A method according to claim 43, in which the optical fibre incorporates one or more further reflective elements and a coiled fibre portion associated with each of the one or more further reflective elements and positioned adjacent its associated further reflective element on the side distal from the end of the optical fibre into which the pulse of probe light is launched.

46 (New). A method according to claim 43, in which the optical fibre incorporates a further coiled fibre portion associated with the or each reflective element and positioned adjacent the or its associated reflective element on the side opposite the coiled fibre portion, the further coiled fibre portion contributing substantially nothing to the spatial extent of the deployed optical fibre, the method further comprising:

launching a second pulse of probe light into the end of the optical fibre on the side of the or each reflective element opposite the further coiled fibre portion;

detecting light emitted from the end of the optical fibre on the side of the or each reflective element opposite the further coiled fibre portion arising from backscattering of the probe light within the optical fibre, the detected light indicative of temperature along the spatial extent of the optical fibre;

generating a second output signal representative of the detected light from the end of the optical fibre on the side of the or each reflective element opposite the further coiled fibre portion;

removing from the second output signal parts corresponding to detected light received from the coiled fibre portion and the further coiled fibre portion;

removing from the said output signal a part corresponding to detected light received from the further coiled portion; and

determining a profile of temperature along the spatial extent of the fibre from the output signal and the second output signal.

47 (New). A method according to claim 43, in which the or each coiled fibre portion has a length in the range 1 m to 500 m.

48 (New). A method according to claim 43, in which the or each coiled fibre portion has a length in the range 1 m to 100 m.

49 (New). A method according to claim 43, in which the or each coiled fibre portion has a length in the range 1 m to 50 m.

50 (New). A method according to claim 43, in which one or more of the or each reflective elements comprises a join between two portions of optical fibre.

51 (New). A method according to claim 50, in which the join comprises abutted end facets of the two portions of optical fibre, each facet arranged at an acute angle to a longitudinal axis of the optical fibre to reduce back-reflection of incident light.

52 (New). A method according to claim 50, in which the join is implemented via an optical fibre connector.